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ly 18 miles per day, and after 9 days turns and goes back as far as B has traveled during those 9 days; he then turns again, and, pursuing his journey, overtakes B $22\frac{1}{2}$ days after the time they first set out. It is required to find the rate at which B uniformly traveled. [From *Greenleaf's Arithmetic.*]

Solution by J. F. TRAVIS, Student in the Ohio State University, Columbus, Ohio.

Let $\frac{2}{2}$=number of miles B traveled per day. Then
$22\frac{1}{2}\times\frac{2}{2}$=total distance B traveled.
$18\times9=162$=number of miles traveled by A in 9 days, and
$162-9\times\frac{2}{2}$=number of miles A is from starting point.
$(9\times\frac{2}{2})\div18=\frac{2}{2}\div2$=number of days A traveled backwards.
$\therefore$ $9+\frac{2}{2}\div2$=total number of days A traveled.
$22\frac{1}{2}-(9+\frac{2}{2}\div2)=13\frac{1}{2}-\frac{2}{2}\div2$=number of days in which A must overtake B.
To overtake B, A must travel $[22\frac{1}{2}\times\frac{2}{2}-(162-9\times\frac{2}{2})]\div18$ days.
$\therefore$ $[22\frac{1}{2}\times\frac{2}{2}-(162-9\times\frac{2}{2})]\div18=13\frac{1}{2}-\frac{2}{2}\div2$, from which we find $\frac{2}{2}=10$= number of days.

This problem was also solved by *F. R. HONEY*, *G. B. M. ZERR*, and *M. A. GRUBER*. Mr. Gruber gave an alegebraic solution and discussed the problem in general.

88. Proposed by J. A. CALDERHEAD, M. Sc., Professor of Mathematics, Curry University, Pittsburg, Pa.

Find the principal of a note given March 19, 1891, bearing interest 6%. Payments: September 1, 1892, \$243.50; January 19, 1893, \$6.90; April 13, 1894, \$19.10; September 19, 1894, \$110.90. Amount due February 22, 1897, \$229.10.

Solution by COOPER D. SCHMITT, A. M., Professor of Mathematics. University of Tennessee, Knoxville, Tenn.; P. S. BERG, B. Sc., Superintendent of Schools, Larimore, N. D., and NELSON L. RORAY, Professor of Mathematics, South Jersey Institute, Bridgeton, N. J.

The amount \$229.10 due February 22, 1897, has been running 2 years, 5 months, 3 days. Hence the principal is easily found to be \$200.

The payments of \$6.90 and \$19.10 are evidently less than the interest.

Hence the \$200 has been running since September 1st, 1892, or 2 years, 18 days. But the payments \$6.90, \$19.10 and \$110.90 must be added to the \$200, making \$336.90.

Working back we find that this on September 1st, 1892, was \$300. But \$243.50 was paid on this date; hence we have \$543.50 as principal and interest which has been running since March 19, 1891, or 1 year, 5 months, 12 days.

Whence amount=\$543.50. Rate=6%. Time=1 year, 5 months, 12 days, and hence principal is easily found to be \$500.

Also solved by *G. B. M. ZERR.*

89. Proposed by NELSON L. RORAY, South Jersey Institute, Bridgeton, N. J.

Solve by pure arithmetic. A criminal having escaped from prison traveled 10 hours before his escape was known; he was then pursued so as to be gained upon 3 miles an hour: after his pursuers had traveled 8 hours they met an express going at same rate as themselves, who had met the criminal 2 hours and 24 minutes before; in what time from the commencement of the pursuit will they overtake him?